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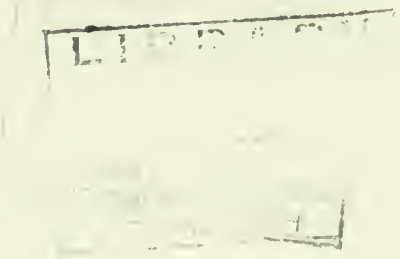
Report of
the Second
Study Group
Conference on



MYCOPLASMA GALLISEPTICUM INFECTION in Chickens and Turkeys

U.S. DEPARTMENT OF AGRICULTURE Agricultural Research Service ARS 91-55

FOREWORD

This is the official report of a Second Study Group Conference on *Mycoplasma gallisepticum* infection. The Conference was held in the South Building of the United States Department of Agriculture, Washington, D.C., on April 27 and 28, 1965.

The Conference was coordinated by the Animal Disease Eradication Division (now the Animal Health Division) of the Agricultural Research Service, U.S. Department of Agriculture, at the request of research workers and members of the chicken and turkey industries. The primary purpose of holding the *Mycoplasma gallisepticum* Study Group Conference was to have experienced scientists and poultrymen evaluate new information and re-evaluate data established by a previous conference.

The previous conference dealt largely with research on *M. gallisepticum* infection in poultry and methods available for combating it. *See* ARS 22–81, *A Committee Report on Mycoplasma Gallisepticum Infection in Poultry* for an official report of this earlier conference.

The Second Conference, herein reported, deals primarily with field application of research reported and disease-control guidelines formulated by researchers at the earlier conference. The Conference enabled leaders of the poultry industry, researchers, and disease control officials to exchange information and refine recommendations to the poultry and turkey industries for combating the disease in light of new knowledge developed since the first conference.

This report summarizes the discussions and recommendations of the Second Study Group Work Conference. It is not intended to repeat the information contained in ARS 22–81 which is still recommended as a source of basic information on *M. gallisepticum* infection.

About 60 representatives of all major sectors of the poultry industry, researchers, and animal disease control officials participated in the 1965 Conference.

The information in this report has been reviewed by the Animal Health Division (formerly the Animal Disease Eradication Division), the Animal Disease and Parasite Research Division, the Animal Inspection and Quarantine Division (responsibilities now in Animal Health and Veterinary Biologics Divisions), and the Animal Husbandry Research Division of the Agricultural Research Service, plus a Rewrite Committee composed of: Dr. R. H. McCapes, Mr. John Sams, Dr. Walter Hughes, Dr. B. S. Pomeroy, Dr. C. F. Hall, Dr. R. E. Luginbuhl, and Dr. Harold L. Chute. The report was also reviewed by Mr Roy Ferguson II and Mr. Price Schroeder, representing the National Turkey Federation, and Dr. Nathan Wernicoff, Vineland Poultry Laboratories, Vineland, N. J.

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Report of the Second Study Group Conference on MYCOPLASMA GALLISEPTICUM INFECTION IN CHICKENS AND TURKEYS

Mycoplasma gallisepticum infection is an infectious disease of chickens and turkeys. It is known as chronic respiratory disease (CRD) in chickens and infectious sinusitis (IS) in turkeys. It is caused by an agent called *Mycoplasma gallisepticum* (Pleuropneumonia-like organism type S_6) that is widely distributed throughout the United States. Although precise figures are not available, CRD and IS together are known to contribute significantly to multimillion dollar losses to the chicken and poultry industries from airsacculitis. These losses include mortality of poultry, reduced meat and egg production, carcass condemnation losses, and increased costs due to medication.

BACKGROUND

In May 1962, a Study Group on *M. gallisepticum* infection met in Washington at the invitation of the Agricultural Research Service of the United States Department of Agriculture. This conference of researchers was called because of a need to analyze and put on paper the results of 10 years of research on this problem. At this meeting, leading scientists brought together the latest research findings on *M. gallisepticum* infection and methods of combating it.

Findings and recommendations of the 1962 conference of researchers are embodied in ARS 22–81, *A Committee Report on Mycoplasma Gallisepticum Infection in Poultry.* This report is considered the best single source of information on the subject.

In the 3 years following the publication of ARS 22–81, new information has been developed, especially that pertaining to field application of the 1962 conference recommendations. Also other significant developments have taken place in research and in the poultry and turkey industries during this time.

Recent Developments

Four significant developments have occurred which affect the *M. gallisepticum* situation since ARS 22–81 was published. These are: (1) Development of standard protocol for making and testing serum-plate and serum-tube agglutination diagnostic antigens used in detecting chicken and turkey flocks having a titer for *M. gallisepticum.*[1] (2) development of State eradication programs for the turkey industry in some producing areas; (3) increased interest in the application of a virulent, live culture of *Mycoplasma gallisepticum* to birds in an attempt to control accidental flock infection; and (4) some countries exclude importation of birds and hatching eggs from flocks which have received the application of live culture as in (3) above.

[1] Scientists from the ANH, ADP, and VB Divisions of ARS, and the States of Iowa, Connecticut, Texas, and Minnesota, and California cooperated in this work.

Study Group Appointed

In view of these developments, a number of leaders of the poultry industry and researchers early in 1965 recommended that the Animal Disease Eradication Division[2] of the Agricultural Research Service, U.S. Department of Agriculture, appoint a second *M. gallisepticum* Study Group, consisting of industry representatives, researchers, and State and Federal disease control officials, to review the situation. It was further recommended that any conclusions and recommendations of the Study Group be made available to the poultry and turkey industries. It was hoped in this way to:

(1) Assist in clearing up confusion that may exist about the available methods for controlling or eradicating *M. gallisepticum* infection; and

(2) Develop uniform recommendations based on the latest, scientifically sound information about the disease for use by the chicken and turkey industries.

The ADE Division agreed to coordinate and assist in the efforts of the Study Group.

[2] Now the Animal Health Division.

THE CONFERENCE PROGRAM

On April 27 and 28, 1965, the Second Study Group Conference was held in Washington, D.C.

Participating in the Conference were representatives of all phases of the chicken and turkey industries, including breeders, hatcherymen, and commercial growers as well as researchers, diagnosticians, and State and Federal disease control veterinarians. About 60 leaders from major chicken- and turkey-raising areas of the country were in attendance. The group elected Dr. B. S. Pomeroy as Study Group Conference chairman.

The Conference opened with a general briefing prior to the work sessions.

The Study Group was divided into three Work Units, representing three major sectors of the industry—broilers, production-laying-chickens, and turkeys.

The Broiler Work Unit was asked to examine the advantages and disadvantages of using *M. gallisepticum* (MG) for the "planned exposure" approach and the selection of clean stock and isolation approach, for establishing MG-clean flocks.

The Work Unit on production-laying-chickens (table egg production) was requested to give special consideration to the egg-dipping and antibiotic-treatment of live birds approaches to control or eradication.

The Turkey Work Unit was asked to study the selection of clean stock and isolation approach.

In addition to the particular subjects assigned to them for study, the Work Units were invited to discuss the other approaches to control or eradication when appropriate.

As a result of exchange of information in the Work Unit meetings and general sessions, the Study Group Conference was able to reach a number of general conclusions. In some areas, the Conference was able to report and make recommendations on new tools and knowledge for combating the disease more effectively. In addition to the general findings, the special Work Units made recommendations relevant to their particular segments of the industry.

The Study Group Conference ended with a general session at which the findings and conclusions of the individual work units were presented. The chairman of the broiler, production laying chickens, and turkey work units read the reports of their respective groups and submitted them for acceptance by the Conference as a whole. As they were presented, the individual work unit reports were open to question, discussion and amendment by participants of the general session, after which the amended reports were accepted by vote of the general session of the Study Group Conference. Some of the findings and conclusions in the reports of the individual work units and amendments were adopted unanimously by the Study Group Conference and others were adopted by a majority vote.

In the interest of brevity, this report of the Second Study Group Conference gives the ARS 22–81 references with page numbers where practical instead of unnecessarily repeating the text.

GENERAL FINDINGS AND RECOMMENDATIONS

Some of the more significant general findings and recommendations of the Study Group Conference are summarized in this section. (For more detailed reports of the individual Work Units on broilers, production-laying-chickens, and turkeys see later sections.)

Long-range Goal

The Study Group Conference agreed that:

- Eradication of *M. gallisepticum* infection, beginning with breeder stock, should be the long-range goal of the poultry and turkey industries.
- Participation in any *M. gallisepticum* clean program should be voluntary.

Major Approaches to Control or Eradication

A number of general points were made about the four major approaches to control or eradication which are defined as follows:

- As used in this report, the Selection of Clean Stock and Isolation Approach refers to the application of serological or other tests to flocks of turkeys and chickens, followed by the isolation of flocks determined to be MG-clean.
- "Planned exposure" refers to the intentional exposure of susceptible poultry to viable *Mycoplasma gallisepticum* organisms in an attempt to develop a resistance in the birds to this infection. The exposure

may be through injection or by other means. MG-cultures for "planned exposure" are not available commercially.

- The term egg dipping refers to a patented process of putting warm chicken or turkey eggs into a cold solution of drugs dissolved in water. The purpose of egg dipping is to have the drug from the cold solution penetrate the warm egg by vacuum action and inhibit or destroy MG and other harmful organisms within the egg.
- In drug treatment of live birds, massive doses are given by injection or ingestion to chickens or turkeys of any age with the purpose of eliminating MG-organisms in the bird.
- With any cleanup program, no matter which of the four approaches selected, followup testing is an indispensable requirement.

Some of the more significant points of the four approaches to control or eradication follow:

Selection of Clean Stock and Isolation Approach

- Some commercial breeders and researchers have been able to develop and maintain flocks of chickens and turkeys free of *M. gallisepticum* by testing and strict isolation of clean flocks.
- Tests for establishing MG-clean status of flocks should be conducted by a qualified laboratory approved by the appropriate State agency, using antigen officially approved by the U.S. Department of Agriculture.
- Uniform standards for serological testing facilities (including materials used in testing) should be established by the Animal Health Division for use by the States.
- A standard definition of MG-clean flocks is needed by the poultry industry for the protection of buyers and guidance of sellers. It is recommended that flocks sold as MG-clean should be required to meet the 100 percent negative test requirements as set forth under heading, "Requirements for MG-Clean Breeding Flocks," page 6.
- Successful isolation of *M. gallisepticum* in culture is positive evidence of infection. However, failure to isolate leaves the status of the bird in doubt, since light infections may be undetected due to inadequacies in culturing techniques.
- Repeated serological testing is the best procedure for determination of MG-infected birds and flocks. However, serological tests may give spurious results due to cross agglutination of *M. gallisepticum* antigen with *M. synoviae* antiserum.
- It is recommended that the U.S. Department of Agriculture take the necessary steps to assure that a standardized, uniform *M. synoviae* antigen be made available for testing purposes.

Planned Exposure ("controlled infection") Approach [3]

Much of the Conference discussion focused on the immunization approach to control and eradication. This is variously referred to as "planned infection," "controlled infection," "planned exposure," or a "vaccination program" and possibly other names by poultrymen and scientists.

The Conference made a recommendation regarding the terminology used to describe the immunization approach to *M. gallisepticum* control as follows:

- "Experimental planned exposure" better describes the practice followed by some poultrymen of vaccinating flocks than does the term "controlled exposure." Results of vaccination with *M. gallisepticum* vaccine are still too uncertain for the procedure to be considered "controlled." The Study Group Conference therefore recommends that the term "Experimental Planned Exposure" be adopted to describe *M. gallisepticum* vaccination programs. For purposes of this report, the term has been shortened to "planned exposure."

Some researchers and commercial breeders report success in reducing losses from the disease through use of planned exposure. However, it was the general consensus that:

- Planned exposure has no place in the control of *M. gallisepticum* in turkeys.
- Planned exposure is still experimental and should have close supervision by competent researchers until more scientific data can be accumulated and analyzed.

Egg-dipping Approach

General points and recommendations made by the Conference on the egg-dipping approach to control or eradication include the following:

- The dipping process may prove to be a help in control of *M. gallisepticum* in the production of commercial broilers. It may also be a supplementary technique in foundation breeding operations designed to aid in reducing the level of egg transmission of the infection.
- It must be recognized that some failure will occur if dipping is used as the only treatment in an eradication program.

[3] The inclusion of material on planned exposure does not represent an endorsement by this Study Group Conference.

- The possibility that the disease-producing organism may develop resistance or non-sensitivity to drugs exists and could be a complicating factor in this approach to MG-control.

Antibiotic Treatment of Live Birds Approach

Some general conclusions reached by the Conference regarding antibiotic treatment of live birds for the control and eradication of *M. gallisepticum* infection follow:

- Massive doses of certain antibiotics have been used successfully for the elimination of *M. gallisepticum* infection in some foundation breeding stock.
- No drug treatment has been 100 percent successful in eradicating the infection in egg production flocks.

(NOTE: For restrictions on the use of drugs in control of *M. gallisepticum* consult regulations administered by the Food and Drug Administration, U.S. Department of Health, Education and Welfare, 330 Independence Avenue, S.W., Washington, D.C., 20201)

REPORT OF THE BROILER WORK UNIT

Due to its size and divergent views, it was necessary for the Broiler Work Unit to be divided into three sub-units to consider different approaches to the problem of *Mycoplasma gallisepticum* infection.

Dr. Harold Chute was chairman of the Broiler Work Unit. The assignments and discussion leaders of the sub-units were as follows:

- Sub-unit I, The Selection of Clean Stock and Isolation Approach, Mr. Don Corbett, leader.
- Sub-unit II, Experimental Planned Exposure Approach, Dr. Roy Luginbuhl, leader.
- Sub-unit III, Serology and Medication, Dr. Harold Chute, leader.

Broiler Sub-Unit I: Selection of Clean Stock and Isolation Approach

Conclusions

Repeated serological testing and isolation of MG-clean flocks is the best approach to eradication of *M. gallisepticum* infection from breeding flocks.

The Animal Health Division of USDA should be requested to act as the coordinating body to approve adequate serological testing facilities (including materials used in testing) at each State agency on a uniform basis.

Problem Areas

A number of problem areas exist:

1. An official definition of MG-clean stock is needed to clear up confusion and provide a standard basis for giving this classification.
2. Standardized testing procedures should be adopted.
3. Adequate testing facilities are needed.
4. Importance of good management practices for maintaining the MG-clean status of flocks needs to be stressed.
5. Whether the programs should be voluntary or required was considered.

Requirements for MG-Clean Breeding Stock

Recommendation: Since adequate measures for eliminating MG-infection from flocks (as described in ARS Special Report 22–81) have been provided breeders, it is felt that no matter which of the four "approaches" or combination of "approaches" is chosen, it is possible to produce a 100-percent negative flock. (This flock is designated P.)

Progeny of P flock, designated as F–1, should also be tested 100 percent negative.

Progeny of the F–1 flock, designated as F–2, may be sold as MG-clean.

Therefore, for an F–1 flock to obtain the MG-clean rating, all birds at one isolated unit must come from a 100-percent negative parent flock and must test 100-percent negative at maturity themselves.

If F–1 birds are kept for a second laying year, they must be retested and be 100-percent negative.

Continual alertness should be maintained against the introduction of *Mycoplasma gallisepticum* onto the premise in order to maintain the clean status of the flock. Should evidence of *M. gallisepticum* be determined, the clean status will no longer apply.

Testing Procedures

MG-clean status should be determined by one or more of the following known tests:

1. Rapid serum plate test
2. Tube agglutination test
3. Hemagglutination inhibition test (H. I. test)

These tests should be conducted by an official State agency using antigens officially approved by the U.S. Department of Agriculture.

Flocks with a low reactor rate should be re-examined, using definitive isolation procedures to determine whether *M. gallisepticum* infection actually exists.

Broiler Sub-Unit II: Planned Exposure Approach

Conclusions

Planned exposure (controlled infection) is at best experimental and only recommended on a trial basis. Sufficient information is not yet available for determining its total effect.

Primary breeders should inform customers of the CRD status of parent flocks, of progeny, or eggs offered for sale. Such status information should indicate whether the birds and eggs were produced under a selection of clean stock and isolation program, or a "planned exposure" program, or a drug treatment program.

As an adjunct to eradication, or as an intermediate alternative to eradication, planned exposure may be indicated for use on an experimental basis as follows:

1. To reduce egg transmission in an effort to produce negative stock.
2. For previously negative flocks that have become infected.
3. For flocks that are infected or are likely to become infected. (For example, in situations in which poultry from two sources one of which is infected have to be kept on a farm.)
4. For flocks produced from dams of unknown status.

Pros and Cons of Planned Exposure (Breeding Stock)

Advantages:

1. It simulates natural exposure to reduce the course of infection.
2. It permits uniform exposure at a chosen time.
3. It permits choice of isolates for exposure.
4. It reduces medication costs during natural infection.
5. It increases performance as compared to that of flocks exposed to natural infection.
6. It prevents the drop in egg production and hatchability that occurs in natural infection.
7. It permits primary breeding genetic programs to continue without interruption.
8. It reduces embryo transmission below that of naturally infected flocks.
9. It enables primary and secondary breeders to have freedom of bird movement in their breeding programs.
10. It is a stepping stone toward eventual eradication. (Reduces infection to a point where it could eventually be eradicated.)
11. It provides relief to industry until such time as adequate clean stock is available.
12. It enables the poultryman to know the status of his flock and to revaccinate when necessary.

Disadvantages:

1. It is subject to the intricate problems of effective coordination with other medication and vaccination programs.
2. It produces carrier birds.
3. It has an adverse psychological effect on acceptance of the eradication program.
4. It is complicated by the problem of standardization of vaccine and vaccination techniques.
5. It may endanger nearby clean flocks.
6. Some import countries exclude birds and hatching eggs from vaccinated flocks.
7. Vaccination increases the rearing costs.

Other Considerations

An experimental planned exposure program may offer some advantages over natural exposure.

Information presented to date on broiler-house performance is too incomplete to evaluate results. The record of vaccinated and eradicated broiler flocks should be compared and controlled field trials continued.

At the breeder flock level, information on vaccinated flocks is favorable when compared to naturally exposed flocks. Sufficient information is not available for adequate comparison of vaccinated breeder flocks with those developed by other approaches.

Broiler Sub-Unit III: Serology and Medication

Conclusions—Serological Testing

Serological testing should be a part of any program to control or eradicate *Mycoplasma gallisepticum* of poultry and turkeys.

One-hundred percent testing of a flock is necessary to determine its negative status.

It is recognized that the serological picture may be complicated by *M. synoviae* infection. Therefore, it is recommended that the *M. synoviae* antigen be made available by the U.S. Department of Agriculture for testing purposes.

Conclusions—Use of Antibiotics

The statement in ARS 22–81 (page 2) on the susceptibility of avian *Mycoplasma* to antibiotics is still valid. However, the last sentence should be changed by deleting the word *should*

and substituting the word *may,* so that the corrected sentence will read as follows: They *may* be used, however, when small flocks are being established free of *M. gallisepticum* infection.

Conclusions—Poultry Biologics

The statement on poultry biologics in ARS 22–81 (page 8) should be amplified by the following statement: The eggs used for testing should also be free of *M. synoviae.*

REPORT OF THE PRODUCTION-LAYING-CHICKEN WORK UNIT

The Production-Laying-Chicken Work Unit gave particular consideration to the use of drugs in the control of *M. gallisepticum.* The Unit also discussed planned exposure and criteria for determining MG-infected birds and flocks and reported their conclusions and recommendations.

Dr. Walter Hughes was chairman of the Production-Laying-Chicken Work Unit. Its report follows:

Use of Drugs in the Control of MG-Infection

General Conclusions

Drugs are used for egg dipping and for antibiotic treatment of live birds to control *M. gallisepticum* infection. As with other MG-control approaches, the long-term objective of egg dipping and live-bird treatments is eradication. However, neither egg dipping nor any drug treatment of live birds has been 100 percent successful in eradicating the infection when used alone.

Egg Dipping

Egg dipping is a patented process for infusion of solutes (antibiotics in solution) into clean eggs.

The commonest method of egg dipping is to immerse clean warm eggs into a cold antibiotic solution. The manufacturer's directions for using the solute should be followed.

Another process for infusion of solutes into eggs is to apply a vacuum to the eggs. Results reported from use of this technique have been inconsistent.

Some observations on the use of egg dipping in parent stock production, in commercial broiler production, and in production of foundation stock follow:

1. *Use for Parent Stock Production*
   - Clean hatches can be produced from dipped eggs from infected breeders.
   - Egg dipping can be an adjunct to other control programs but is not sufficient by itself.
2. *Use in Commercial Broiler Production*
   - Under practical industry conditions, dipping has not given universally good results.
   - Egg dipping fails when good breeder and hatchery management practices are not followed.
   - At supply flock level, serious drops in hatchability result if faulty dipping procedures are followed. The most important cause of failure is bacterial contamination.
3. *Use in Production of Foundation Stock*
   - Egg dipping is a logical but not vital adjunct to cleaning up basic breeding stock.
   - The number of eggs that must be treated is small.
   - Closer surveillance can be maintained on rearing and testing of the stock than is practical when larger numbers of birds are involved.
   - It must be recognized that some failure will occur if dipping is used as the only treatment in an attempted eradication program.
4. *Summary of Possible Uses*
   The dipping process may prove helpful in controlling *M. galliscepticum* infection at the commercial broiler level. It may be a supplementary technique for reducing egg transmission of the infection at the foundation breeding operations level.

Drug Treatment of Live Birds

1. The purpose of treating live birds with antibiotics is to eliminate *M. gallisepticum* infection.
2. No drug treatments have been 100 percent successful.
3. Massive doses of certain antibiotics have been used in the laboratory and in pilot trials for the elimination of *M. gallisepticum* infection in foundation breeding stock with generally successful results. These drug treatments, which are still experimental, are subject to Food and Drug Administration regulation.

General Observations on Drugs in MG-control

1. Followup testing is an indispensible requirement of any cleanup program.
2. The possibility of organism resistance to drugs exists.
3. Air sac lesions in embryos are not always associated with *M. gallisepticum* infection.

Criteria for Determination of MG-infection

Isolation of M. gallisepticum in Culture

1. Successful isolation is positive evidence of infection.
2. Failure of isolation leaves status of bird in doubt since light infections may be undetected due to inadequacies in culturing techniques.

Serological Testing as a Criterion for Infection

1. Repeated serological testing is the best procedure.
2. Possibility of spurious results exists with serological tests.
   - Cross agglutination of *M. synoviae* and *M. gallisepticum* may give misleading results.
   - A standardized uniform antigen is very important for accurate test results.

Planned Exposure

Planned exposure of replacement chickens with *M. gallisepticum* to control CRD is still in the experimental stage. Until positive scientific data are available, distribution of seed or exposure cultures should be limited to persons qualified to conduct scientific evaluation.

Disadvantages of Planned Exposure for MG-control

1. Non-acceptance of inoculated stock by some foreign countries.
2. Conflict with eradication program now in force in turkeys.
3. Difficulty of controlling bootlegging of "vaccine."
4. Lack of controlled data on performance of "vaccine."

Advantages of Planned Exposure for MG-control

1. Avoidance of MG "break" after birds get into production.
2. Production of MG-free progeny. (Evidence on this is limited.)
3. One practical approach to beginning foundation stock cleanup.
4. No untoward reaction of birds following vaccination provided they had been previously immunized for Newcastle disease and infectious bronchitis and no vaccination done for 4 weeks subsequent to exposure with *Mycoplasma*.

REPORT OF THE TURKEY WORK UNIT

The Turkey Work Unit agreed that the objective of the turkey industry should be the eradication of *M. gallisepticum* from turkey breeder flocks. It also made a recommendation for a testing program in order to establish MG-clean breeder flocks under uniform procedures.

Dr. B. S. Pomeroy was chairman of the Turkey Work Unit. Its report follows:

Conclusion

The objective of the turkey industry should be the eradication of *M. gallisepticum* from the turkey breeder flocks.

Current Developments

Since the publication of ARS 22–81 standardized antigens have been developed and diagnostic procedures improved. These developments have shown that the eradication of *M. gallisepticum* from turkey breeders is possible and can be accomplished without too great an economic burden on the industry. This has been demonstrated in various turkey-producing areas in the United States.

This success has been based on the elimination of egg transmission from the breeding stock to the poult. It has reduced the level of infection to such an extent that experimental planned exposure has no place in the control of *M. gallisepticum* in turkeys.

Basic Essentials of an Eradication Program

1. All hatcheries and breeder flock operators must participate 100 percent.
2. *M. gallisepticum* infection in turkeys should be made a reportable disease.
3. Infected flocks must be placed under surveillance.
4. Import regulations covering the importation of turkey hatching eggs, poults, or breeding stock should be developed to protect the turkey industry in areas where an eradication program is in effect.

The Maintenance and Identification of MG-clean Turkey Breeder Flocks

1. Strict adherence to the principles of sanitation and management to control *M. gallisepticum* infection as outlined in ARS 22–81 (pages 8, 9, and 10) is fundamental in the control of infectious sinusitis in turkeys.

2. In the establishment of MG-clean turkey breeding flocks, the following areas must be covered:

Potential breeders must be selected from flocks which show no clinical evidence of *M. gallisepticum* infection, and birds so selected should then be tested to prove that they are not carrying antibodies against the infection.

This means that paragraph 146.10 (G) CFR Amendment 64–80 U.S. *M. Gallisepticum* Tested needs to be strengthened and improved by 100-percent testing or periodic random sample testing, by periodic breeder flock inspection and by proper identification of hatching eggs and poults.

The HI test shall be used to confirm the results of other serological tests. When reactors are submitted as prescribed by the official State agency, the following criteria shall be used to determine if the flock is negative for *M. gallisepticum:* (a) Active air sac lesions; (b) recovery of *M. gallisepticum;* and (c) supplemental serological tests.

If all of the above tests are negative, the flock shall be deemed to have had no *M. gallisepticum* reactors.

If *M. gallisepticum* organisms are recovered, the flock is considered infected.

If either of the other two tests is positive, the flock is considered suspicious and additional laboratory tests shall be conducted before the final disposition of the flock is determined.

3. Since experimental data have shown that egg dipping or drug or antibiotic treatment of turkey breeders have not completely eliminated egg transmission of *M. gallisepticum,* these procedures shall only be used in exceptional circumstances such as maintaining special bloodlines.

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Name	*Title and Affiliation*	*Business Address*
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Staples, Walter	Poultry Health Director, Cobb Breeding Corp.	Concord, Mass.
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Wilmoth, E. J.	Sales Manager, Peterson Farms, Inc.	Decatur, Ark.
Winterfield, R. W.	Technical Director, Amdal Co.	N. Chicago, Ill.

CONFERENCE AGENDA

Mycoplasma gallisepticum Study Group

April 27, 1965

Chairman — Mr. Sam Moore

9:30 a.m. ..... Welcome—Dr. F. J. Mulhern
..... Purpose of Meeting—Dr. R. E. Omohundro
..... Review Plan of Operation of Study Group—Dr. O. L. Osteen
..... Review Plan of Operation of Work Units—Dr. J. W. Walker
..... Question/Answer Period
..... Announcements

10:30 a.m. ..... Group Picture

10:45 a.m. ..... Breakup into Work Units for Broilers, Chickens, and Turkeys

11:00 a.m. ..... Work Unit Meetings (11:00 a.m. to 5:00 p.m.)

Work Unit #1 Broilers
Work Unit #2 Chickens
Work Unit #3 Turkeys

April 28, 1965

9:00 - 10:00 a.m. ..... Work Units meet separately if needed

10:00 - 12:30 p.m. ..... Entire Study Group Reconvene
Chairman—Dr. B. S. Pomeroy
..... (a) Work Unit #1 Report & Discussion

12:30 - 1:30 p.m. ..... Lunch

1:30 - 5:00 p.m. ..... Entire Study Group Reconvene
..... Continue Work Unit #1 Discussion
..... Work Unit #2 Report & Discussion
..... Work Unit #3 Report & Discussion

SUGGESTED AGENDA, WORK UNIT #1: BROILERS

Chairman—Dr. Harold Chute

I. CONTROLLED INFECTION PROGRAM

(A) General Subjects—

(1) Objectives of Controlled Infection Program.

(2) Shedding of Organisms.

(a) By vaccinated breeder and multiplier flocks other than through the egg.

(b) Through the egg to the broiler chick. How frequent? How long after vaccination?

(3) Special care required of vaccinated flocks—isolation, treatments, costs, etc.

(4) Spread of infection from vaccinated flocks to susceptible flocks.

(5) Is it necessary to test for "take(s)?" Time to test? What percent?

(6) Length of time a vaccinated bird has a titre.

(7) Length of time a vaccinated bird is resistant.

(8) Relationships and effect between *Escherichia coli* and viruses with *Mycoplasma* controlled infection program.

(B) Breeding Flocks

(1) to (9) below as applicable.

(C) Multiplier Flocks

(1) In what situation is the controlled infection program preferred.

(2) Age of vaccine administration, dosage, route(s) of administration.

(3) Vaccine standardization.

(4) Care of vaccine in field.

(5) Fitting *M. gallisepticum* controlled infection into a flock vaccination program. Revaccination for *M. gallisepticum*.

(6) Contraindications to controlled infection program.

(7) Summarize distinct *advantages* and *disadvantages* of this controlled infection program.

(8) Incorporating controlled infection with other approaches to *M. gallisepticum* control or eradication.

(9) Outline a recommended controlled infection program.

(D) Broiler Flocks

(1) to (9) above as applicable.

(10) Condemnation problems in broilers from vaccinated parents.

(E) Other recommendations not covered above as applicable in each type of flock.

II. SEROLOGICAL TEST PROGRAM

(A) General Subjects—

(1) Objectives of a Serological Test Program.

(2) Susceptibility to exposure or breaks.

(3) Special care or precautions required.

(4) Interpretation of tests required for monitoring; i.e. pipped embryos, cull chicks, and serology.

(5) Interpretation of questionable test results.

(B) Multiplier Flocks

(1) In what situation is the serological testing program preferred.

(2) Age at test, type of test(s), frequency.
(3) Care of flocks; i.e. isolation, treatments, costs, etc.
(4) Summarize distinct *advantages* and *disadvantages* of this program.
(5) Incorporating test program with other approaches for *M. gallisepticum* control or eradication.
(6) Handling flocks that break.
(7) Outline a recommended testing program.

(C) Breeding Flocks
(1) to (7) above as applicable.

(D) Broiler Flocks
(1) to (7) above as applicable.

(E) Other recommendations not covered above as applicable in each type of flock.

III. PROGRAM OF EGG DIPPING IN BREEDING POULTRY IN THIS CLASS—

(The Egg Dipping Program will be examined in detail by the Chicken Committee; however, Work Unit #1 may want to consider items of special significance to broilers.)

IV. PROGRAM OF DRUG TREATMENT IN BREEDING POULTRY OF THIS CLASS—
(The Egg Dipping Program will be examined in detail by the Chicken Committee; however, Work Unit #1 may want to consider items of special significance to broilers.)

SUGGESTED AGENDA, WORK UNIT #2: CHICKENS

Chairman—Dr. Walter Hughes

I. PROGRAM OF EGG DIPPING IN DRUGS

(A) General—
(1) Objectives of Egg Dipping Program.
(2) Drugs used—drug concentration.

(B) Multiplier and Breeding Flocks
(1) Indications and contraindications of Egg Dipping Program.
(2) Outline a recommended Egg Dipping Program.

(C) Other recommendations not covered above as applicable in each type of flock.

II. PROGRAM OF DRUG TREATMENT IN BREEDER POULTRY

(A) General—
(1) Objectives of Drug Treatment Program.
(2) Drugs used and dosage.

(B) Multiplier and Breeding Flocks
(1) Indications and contraindications.
(2) Outline a recommended drug treatment program.

(C) Other recommendations not covered above as applicable in each type of flock.

III. CONTROLLED INFECTION PROGRAM

You are referred to the Suggested Agenda of the Broiler Controlled Infection Program for subjects to be reviewed and discussed as appropriate.

IV. SEROLOGICAL TEST PROGRAM

You are referred to the Suggested Agenda of the Broiler Serological Test Program for subjects to be reviewed and discussed as appropriate.

SUGGESTED AGENDA, WORK UNIT #3: TURKEYS

Chairman—Dr. Ben S. Pomeroy

I. SEROLOGICAL TEST PROGRAM

(A) General Subjects—

(1) Objectives of Serological Test Program.

(2) Susceptibility to exposure or breaks.

(3) Special care or precautions required.

(4) Tests required for monitoring; i.e., pipped embryos, cull poults, and serology.

(5) Interpretation of questionable test results.

(B) Breeding Flocks

(1) In what situation is the Serological Test Program preferred.

(2) Age of test, type of test(s), frequency.

(3) Care of flocks; i.e. isolation, treatments, costs, etc.

(4) Summarize distinct advantages and disadvantages of this program.

(5) Incorporating this with other approaches for *M. gallisepticum* control or eradication.

(6) Handling flocks that break.

(7) Outline a recommended testing program.

(C) Grower Flocks

(1) to (7) above as applicable.

II. CONTROLLED INFECTION PROGRAM

You are referred to the Suggested Agenda of the Broiler Controlled Infection Program for subjects to be reviewed and discussed as appropriate.

III. PROGRAM OF EGG DIPPING IN DRUGS

You are referred to the Suggested Agenda of the Chicken Egg Dipping Program for subjects to be reviewed and discussed as appropriate.

IV. PROGRAM OF DRUG TREATMENT IN BREEDING TURKEYS

Same as III above.